

FOUR ELECTIONS THAT CHANGED U.S. HISTORY

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A photograph of a dry, hilly landscape. In the foreground, there's a rocky, light-brown ridge. To the right, a large, dark green tree stands prominently. The background shows rolling hills with sparse, dry vegetation under a clear blue sky.

# Fighting for Foxes

A disastrous chain of events nearly wiped out California's diminutive island fox. Scientists hope it's not too late to undo the damage

BY ADELE CONOVER AND ANDREW CURRY  
PHOTOGRAPHS BY LYNDIA RICHARDSON







THE CHANNEL ISLANDS FOX IS one of America's most photogenic creatures—and one of its most endangered. The tiny fox is North America's smallest wild canid, with adults weighing a mere four pounds, and for thousands of years it had the run of six of the eight Channel Islands, which lie 12 to 70 miles off the Southern California coast. The foxes have “not a foe to prey upon them,”



National Park Service biologists (above, Tim Coonan) keep dozens of foxes in cages on Santa Cruz Island, which is owned by the Park Service and the Nature Conservancy. San Miguel, Santa Rosa, Anacapa and Santa Barbara islands are U.S. parkland. The Navy owns San Nicolas and San Clemente. A conservation group owns most of Catalina, home to 3,500 people.

a biologist wrote on a 1920s Channel Islands expedition. “Casualties are rare and they must live out their natural lives unmolested.” As recently as 1994, scientists estimated that more than 1,500 foxes lived on Santa Cruz Island, the biggest in the chain. Today, however, only about 80 remain in the wild there. On San Miguel and Santa Rosa islands the fox is considered extinct in the wild. It was placed on the federal endangered species list this past March.

The animal's astonishing decline testifies to the fragility of ecosystems, as does the intense effort under way to reestablish the animal in its native habitat. Island mammals, because they're cut off from other environments, are particularly sensitive to disruptions in the balance of predators and prey, and it was a series of seemingly unrelated events on the northern Channel Islands that cascaded—with almost no warning—to the present crisis. “If you had asked me back in the 1980s if island foxes would be listed as an endangered species today, I would have said you're crazy because there's nothing out there that threatens their extinction,” says Paul Collins, a curator of vertebrate zoology at the Santa Barbara Museum of Natural History. “Obviously, things have changed dramatically.”

At first, the population plunge baffled scientists, who thought the animals were dying from disease. But a discovery made in 1994 by Gary Roemer, then a graduate student at the University of California at Los Angeles who was conducting field research on Santa Cruz Island, provided the definitive clue. Examining a fox corpse, he noticed wounds that could have been made only by a golden eagle.

Roemer initially assumed that the killing of the fox was an aberration. But soon, he says, evidence to the contrary was unmistakable: “Ninety percent of fox carcasses I found were victims of golden eagle predation.” And the problem was getting worse. The fox's numbers would fall 95 percent in just five years. On Santa Rosa Island, for instance, the population went from more than 1,500 foxes in 1994 to 14 in 2000. By then, scientists and conservationists had already begun to capture the few remaining foxes on the northern Channel Islands and started breeding them in captivity.

Golden eagles had colonized the area in the early 1990s, drawn partly by easy prey—especially baby feral pigs, which have flourished on the islands since ranchers introduced them in the 1850s. The birds have wreaked the heaviest toll on foxes on the northern islands of Santa Rosa, Santa Cruz and San Miguel. (On populated Catalina, canine distemper from domestic dogs has killed many of the foxes. The fox is



holding its own on San Nicolas and San Clemente islands.) Still, there was more to the golden eagles' arrival than an abundance of pork. The birds had long been kept away by bald eagles, which are highly territorial. The balds, once the islands' top predators, ignored the foxes, subsisting mainly on fish, seal carcasses and fish-eating predators like sea gulls.

But the bald eagle began to disappear in the 1950s, the victim of another unintended consequence. From 1947 to 1971, the Montrose Chemical Corporation—at the time the world's largest manufacturer of DDT—dumped pesticide-laced wastewater into the Los Angeles sewer system, which empties into the ocean. The dumping left tons of DDT-contaminated sediment on the ocean floor near the Channel Islands, and the chemical moved up through the food chain. Small quantities of DDE, a breakdown product of DDT, accumulated in fish and fish-eating birds and mammals, and were then concentrated in the bodies of top predators such as eagles and pelicans. DDE, scientists say, makes eggshells so thin and porous that they break during incubation or causes the eggs

to dry out and fail to hatch. By 1960, bald eagles had vanished from the islands.

Though DDT was banned in 1972 and bald eagle populations across the United States have slowly begun to recover, massive amounts of pesticide-contaminated sediment off the California coast near Los Angeles have kept the birds from flourishing in the Channel Islands on their own. About three dozen bald eagles are known to nest in the islands, but some biologists speculate that it may be generations before bald eagle eggs there are healthy enough to hatch unaided. That's partly because DDE is slow to break down. "[DDE] is going to be there for a long time," Collins says; it could be a problem for another century.

The bald eagles' disappearance, scientists speculate, left an opening for the golden eagles. Scientists aren't sure why golden eagles took so long to colonize the islands, but by the mid-1990s the birds had become a nightmare for the little foxes. The eagles eat almost anything. Analyses of their nests have shown that the islands have served as a buffet for golden eagles. "We found remains of everything from mead-



Island fox populations have been devastated by golden eagles (like the one below), which also eat baby feral pigs (above). To reestablish the fox, scientists are relocating the golden eagles to the mainland and plan to rid the island of pigs by killing them.



owlarks to mule deer fawns," Roemer says. "It doesn't take much to change the overall way in which an ecosystem is structured," Collins says.

One approach to reestablishing the island fox on the northern Channel Islands is to remove the golden eagles and their primary food source, the feral piglets. In 1999, biologists started laboriously capturing and relocating the birds using nets and piglets as bait. The eagles proved a formidable adversary, often passing up free meals if they suspected a trap. "If these golden eagles see you a mile and a half away, they'll fly away over the nearest ridge and they are gone," says Brian Latta, lead field biologist with the Predatory Bird Research Group at the University of California at Santa Cruz. "You will not find them sitting on a post or a perch watching you. They are incredibly smart." It took five years to capture 37 eagles and release them east of California's Sierra Nevada; from there, some have flown as far away as Idaho and Oregon. So far, the eagles banished from the islands have stayed away. "At release sites in Northern California there are plenty of ground squirrels" for

the transplanted golden eagles, says Tim Coonan, a wildlife biologist with the National Park Service. It's as if, Coonan adds, the relocated eagles "have gone to heaven."

Scientists hope that eliminating feral pigs will deter new golden eagles from making the islands their home. Park officials say that simply controlling the pig population is unrealistic; the animals breed so quickly they can double their number every four months. And because the pigs may carry diseases, biologists are loath to move them to the mainland, where they might infect domestic stock. Instead, the Park Service and the Nature Conservancy have built 45 miles of pig-proof fencing on Santa Cruz Island to corral pigs, which will be shot and killed. With as many as 5,000 feral pigs already contained on Santa Cruz, Coonan says exterminating the animals could take as long as two years.

Another way to bring back the fox is to reestablish the bald eagle. On Santa Cruz Island, scientists are releasing 12-week-old birds into the wild. And on Santa Catalina, scientists are closely monitoring bald eagle nests and removing new eggs to



Researchers are gradually reintroducing bald eagles (above, Peter Sharpe, with a juvenile bird) to Santa Cruz Island, a crucial step in saving island foxes. The young birds are kept in cage-topped towers until they are able to fly and fend for themselves.





Wildlife researchers in the Channel Islands (Sharpe, dangling from a helicopter, nabs bald eagle eggs from a nest on Santa Catalina) will have spent millions of dollars to overcome ecological damage traceable to decades-old DDT waste.

give them a better chance of hatching, in a laboratory. The scientists replace the stolen eggs with fakes, which the birds incubate. Making the switch is no easy feat. Wildlife biologist Peter Sharpe, nicknamed the Dope on a Rope by his colleagues for his derring-do, has hung over a nest by a 100-foot rope from a hovering helicopter. The eggs, stored in portable incubators and flown to the San Francisco Zoo, are put in other incubators. Once chicks hatch—and only 18 percent do—the same high-flying technique is used to take them back to their nests. The proud parents usually notice. “They sort of look at [the chick] sideways, then they try to sit on it, raise it, feed it,” says Sharpe. The high jinks seem to be paying off. The Channel Islands today are home to 15 juvenile bald eagles.

Whether the bald eagles are directly responsible for driving away golden eagles is uncertain, but at least three golden eagle pairs had abandoned their nests on Santa Cruz and Santa Rosa islands as of April 2004. “We haven’t seen a new golden eagle since February 2004,” says Coonan.

Even so, the islands are still no place for foxes. In late November 2003, after 29 golden eagles had been removed from Santa Cruz, the biologists released nine captive-reared, radio-collared Channel Islands foxes. Five were killed by golden eagles between December 21, 2003, and January 4, 2004. “The little foxes spent three or so weeks in the field, but when the goldens killed some of them, we had to bring them in,” Coonan says.

By February 2004, the remaining captive-bred foxes were in pens on Santa Cruz, cared for by biologists with the National Park Service, which owns part of the island chain. Until their fate is more secure, they will stay caged, enjoying magnificent views from their mesh enclosures. Today on Santa Cruz Island, 44 captive foxes look out on a lilac-covered hill to the south and a stand of eucalyptus trees to the north. Park officials hope that the designation of the animal as an endangered species will attract attention—and funding—to the recovery project, which the Park Service estimates may cost more than a million dollars next year.

Species on the brink of extinction rarely make rapid recoveries. But scientists and conservationists are cautiously optimistic that the foxes on the northern Channel Islands have a chance, now that steps to restore some of the traditional balance to the islands’ animal communities have been taken. “Perhaps we don’t have to wait for a lengthy time for things to turn around,” says Channel Islands National Park superintendent Russell Galipeau. “[I hope] we will live to see the results.” ○

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